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26TH INTERNATIONAL CONFERENCE ON SOILS, SEDIMENT, WATER AND ENERGER

Paul Kostecki
ASSOCIATION FOR ENVIRONMENTAL HEALTH & SCIENCES FOUNDATION, INC.
150 FEARING ST STE 21
AMHERST, MA 01002-1945

02/10/2016
Final Report

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FINAL PROGRAM

2010 CONFERENCE PROGRAM

The 26th Annual International Conference on

Soils, Sediments, Water and Energy

October 18-21, 2010

University of Massachusetts
Amherst, MA

Conference Co-Directors

Paul Kostecki, Ph.D.
University of Massachusetts Amherst

Edward J. Calabrese, Ph.D.
University of Massachusetts Amherst

Clifford Bruell, Ph.D.
University of Massachusetts Lowell

AEHS Foundation

Presented By

The Association for Environmental Health & Sciences Foundation

140 Presenters ▪ 60 Posters ▪ 11 Workshops ▪ 48 Exhibitors

Profiles of the 2010 Lifetime Achievement Award Winners Included!

2010 SPONSORS

ADVENTUS · API · Dragun Corporation Environmental Consultants · KERFOOT TECHNOLOGIES · MECX · MassDEP · REGENESIS · Geosyntec · AECOM · CDM · TRIDENT

Workshops

Monday, October 18, 2010

8:00am – 12:00pm **1. Assessment and Evaluation of Vapor Intrusion at Petroleum Release Sites,** *Rm 163, Lower Level*

1:00pm – 5:00pm **2. Enhanced NAPL Recovery Using Surfactants,** *Reading Room, Concourse Level*

1:00pm – 5:00pm **3. Geochemical Evaluations of Metals in Environmental Media: How to Distinguish Naturally Elevated Concentrations from Site-Related Contamination,** *Rm 917, 9th Floor*

1:00pm – 5:00pm **4. Hands-On Sustainability Assessment Tools,** *Rm 168, Lower Level*

2:00pm – 5:00pm **5. Environmental Fate of Hydrocarbons in Soils and Groundwater,** *Rm 101, Lower Level*

2:00pm – 4:00pm **9. Utilization of Stable Isotopes in Environmental and Forensic Geochemistry Studies,** *Rm 163, Lower Level*

Platform Sessions

Tuesday, October 19, 2010

Sessions Run Concurrently — Tuesday Morning

Session 1 (8:30am-12:00pm)
MARCELLUS SHALE DEVELOPMENT: ASSOCIATED ISSUES AND IMPACTS

Rm 163, Lower Level

Moderator: Frank Peduto
Spectra Environmental Group, Latham, NY

8:30am
Marcellus Development – The States of the Matter
Greg Sovas, XRM, LLC, Ballston Lake, NY

9:00am
What's "New" in New York? The Status of Permitting Horizontal Drilling and High-Volume Hydrofracturing
Jean M. Neubeck and Thomas M. Johnson, Alpha Geoscience, Clifton Park, NY

9:30am
FracWater Treatment for Recycling: Options, Alternatives; Their Benefits and Limitations
Frank Miller, Lake Country FracWater Specialists, LLC, Livonia, NY

10:00am
Break

10:30am
Drilling Technologies to Meet our Region's Natural Gas Needs
John Holko, Lenape Resources, Alexander, NY

11:00am
Water Use and the Marcellus Gas Play
Jim Richenderfer, Susquehanna River Basin Commission, Harrisburg, PA

11:30am
Shale Development: Economic and Policy Perspectives
John P. Martin, New York State Energy Research and Development Authority, Albany, NY

Session 2 (8:30am-11:30am)
SEDIMENTS

Rm 101, Lower Level

Moderator: Scott Blaha
General Electric, Fort Edward, NY

8:30am
Contaminated Sediment Management – Lessons Learned from the Inner Harbor Navigational Channel, Louisiana
Sivaramakrishnan Sangameswaran, Bioengineering Group, Inc., Tallahassee, FL; H. Ken Wilson, Bioengineering Group, Inc., Salem, MA

9:00am
Nickel and Chromium as Proxy to Identify the Origin of Sediments Adjacent To a Serpentine Outcrop
Jane A. Parkin Kullmann, Haley & Aldrich, Boston, MA; Stephen R. Clough, Haley & Aldrich, Manchester, NH

9:30am
Methods used to Delineate PCB Contamination in Sediment on the Fox River Remediation Project
Stephen McGee, Terri Blackmar, and Dave Richardson, Tetra Tech, Inc., Green Bay, WI; Gary Braun, Tetra Tech Inc., Bothell, WA

10:00am
Break

10:30am
Review of Mechanical and Hydraulic Dredging at Two Sediment Remediation Sites
James Wescott, John Dirgo, and Jack Brunner, Tetra Tech EM, Inc., Chicago, IL; Scott Ireland and Scott Cieniawski, US EPA Great Lakes National Program Office, Chicago, IL

11:00am
PCB Release Caused by Phase 1 Dredging on the Upper Hudson River
John P. Connolly, Anchor QEA, LLC, Montvale, NJ; John G. Haggard, General Electric Company, Albany, NY

Session 3 (9:00am-12:00pm)
PHYTOREMEDIATION

Reading Room, Concourse Level

Moderators: Jason White
Connecticut Agricultural Experiment Station, New Haven, CT
Lee Newman
University of South Carolina, Columbia, SC

9:00am
Phytoremediation of Soils Contaminated Persistent Organic Pollutants
Jason C. White, Connecticut Agricultural Experiment Station (CAES), New Haven, CT

9:30am
Assessing Tungsten Transport in the Vadose Zone: From Dissolution Studies to Soil Columns
Gulsah Sen Tuna, Washington Braida, Adebayo Ogundipe, Center for Environmental Systems, Hoboken, NJ; David Strickland, U.S. Army Picatinny Arsenal, Picatinny, NJ

10:00am
Break

10:30am
Development of Phytosensors for Monitoring Environmental Arsenic
Blake Joyce, Jason Abercrombie, and C. Neal Stewart, Jr., The University of Tennessee, Knoxville, TN; Mark P. Elless and David Lee, Edenspace Systems Corporation, Dulles, VA

11:00am
Engineering Plants for Arsenic Containment
Om Parkash Dhankher, University of Massachusetts, Amherst, MA

11:30am
Growth and Developmental Enhancement of Poplar *(Populus deltoides x nigra OP367)* by Associated Endophytic Bacteria
Adam Hoffman, Safiyh Taghavi, Daniel van der Lelie, and Lee A. Newman, Brookhaven National Laboratory, Upton, NY; Michael Walla, University of South Carolina, Columbia, SC

Luncheon Speaker • Tuesday, October 19, 2010 • 12:00pm-1:30pm • Amherst Room, 10th Floor, Campus Center

DEVELOPING HEALTH-BASED PRE-PLANNING CLEARANCE GUIDELINES FOR SITE REMEDIATION FOLLOWING A CHEMICAL TERRORIST ATTACK

Annetta Watson, Ph.D., *Toxicology and Hazard Assessment, Oak Ridge National Laboratory, Oak Ridge, TN*

In the event of a chemical terrorist attack on a transportation hub, post-event remediation and restoration activities necessary to attain unrestricted facility re-use and re-entry could require hours to multiple days. While timeframes are dependent on numerous variables, a primary controlling factor is the level of pre-planning and decision-making completed prior to chemical release. The presenter and co-authors have identified key considerations, critical information and decision criteria to facilitate post-attack and post-decontamination remediation activities.

The presented clearance decision criteria analyses provide documentation of multi-pathway, health-based remediation exposure guidelines for 3 selected toxic industrial compounds (hydrogen cyanide, cyanogen chloride, phosgene) and 6 chemical warfare agents (5 nerve agents and the vesicant agent sulfur mustard) as well as agent degradation products) for pre-planning application in anticipation of a chemical terrorist attack.

This work has been performed by the US Department of Homeland Security as a national case study conducted in partnership with the Los Angeles International Airport and The Bradley International Terminal. All recommended guidelines have been selected for consistency with airport scenario release parameters of a one-time, short-duration, finite airborne release from a single source followed by compound-specific decontamination.

Platform Sessions

Tuesday, October 19, 2010

Sessions Run Concurrently — **Tuesday Afternoon**

Session 1 (1:30pm-5:30pm)
SUSTAINABLE REMEDIATION/ SUSTAINABILITY

Rm 163, Lower Level

Moderator: Michael Miller,
CDM, Cambridge, MA

1:30pm
Sustainable Remediation: What is it and how is it applied?
Michael Miller, CDM, Inc., Cambridge, MA

2:00pm
The Precautionary Principle and Sustainability: A Systems Perspective
David Ludwig, Tim Iannuzzi, and Gwen Gibson, ARCADIS, Annapolis, MD; Greg Mcgowan, ARCADIS, Santa Maria, CA

2:30pm
Quantification of Greenhouse Gas Emissions and Energy Consumption from Remediation Systems
Jeff Brammer, EcoVac Services, Moore, OK; Nick Athens and Michiya Suzuki, EcoVac Services, Woodstock, GA

3:00pm
Break

3:30pm
Using Renewable Energy on Remediation Sites - Life Cycle Assessment of a 2.5MW Wind Turbine
Angela Fisher and William Flanagan, GE Global Research Center, Niskayuna, NY

4:00pm
Sustainable Remediation and Redevelopment of Colonial-Era Paper Mill in Boston
Elliot I. Steinberg, Haley & Aldrich, Inc., Boston, MA

4:30pm
Application of Sustainable Principles and Green Technologies at Brownfield Sites
John Albrecht and Michael Doherty, AECOM Environment, Rocky Hill, CT; Christopher Carleo, AECOM Environment, Westford, MA

5:00pm
Changes to EPA's Spill Prevention, Control, and Countermeasure (SPCC) Program
Alex Sherrin, U.S. EPA New England Oil Program, Boston, MA

Session 2 (1:30pm-5:30pm)
CLEAN ENERGY

Room 101, Lower Level

Sponsored by **Air Force Research Laboratory**

Moderator: Janine Commerford,
MA DEP, Boston, MA

1:30pm
Personalized Energy and Water for the Non-legacy World
Daniel G. Nocera, MIT, Cambridge, MA

2:00pm
Protein Design, Synthetic Biology and Hybrid Metamaterials
Ronald Koder, The City College of New York, New York, NY; Sean Elliott, Boston University, Boston, MA

2:30pm
One Billion Tons of Biomass Would Be Sufficient to Completely Replace Crude Oil If We Increased Their Energy Conversion Efficiency
Percival Zhang, Virginia Tech, Blacksburg, VA

3:00pm
Break

3:30pm
Green Gasoline: Renewable Liquid Transportation Fuels from Plant Biomass
George W. Huber, University of Massachusetts, Amherst, MA

4:00pm
Routes for Using Polymer in Photovoltaic Applications
Tom Russell, University of Massachusetts, Amherst, MA; R. Hayward, T. Emrick, B. Hammer, L. Li and D. Chen

4:30pm
Charge Transport as the Basis for Clean Energy Devices
Thai Thayumanavan, University of Massachusetts, Amherst, MA

5:00pm
A Path for High Volume Production of Ordered Hybrid Materials for Energy Applications
James J. Watkins, University of Massachusetts, Amherst, MA

Session 3 (1:30pm-5:30pm)
NANOTECHNOLOGY

Reading Room, Concourse Level

Moderators: David Ludwig and Tim Iannuzzi,
ARCADIS, Annapolis, MD

Kate Sellers, *ARCADIS, Chelmsford, MA*

1:30pm
Nanotoxicology: Is There a "There" There?
John Schell, ENTRIX, Houston, TX

2:00pm
Nanomaterial and Human Health
Debra Kaden, ENVIRON International Corporation, Boston, MA

2:30pm
A Collaborative Effort to Promote the Safe Development of Nanotechnology in Massachusetts
Carol Rowan West, Department of Environmental Protection, Boston, MA

3:00pm
Break

3:30pm
The Aquatic Toxicity of Nanoparticles: Knowledge, Needs, and the Role of Water Quality in Altering Nanoparticle Toxicity
Scott Hall, ENVIRON, Brentwood, TN

4:00pm
Nanomaterials for Water Treatment: Advantages and Implications for Fate and Transport
Gautham B. Jegadeesan, Gradient, Cambridge, MA

4:30pm
The Precautionary Principle Uses and Abuses: Lessons Learned for Emerging Technologies
David Ludwig, Tim Iannuzzi, and Gwen Gibson, ARCADIS, Annapolis, MD; Greg Mcgowan, ARCADIS, Santa Maria, CA; Kate Sellers, ARCADIS, Chelmsford, MA

5:00pm
Regulatory Developments and Product Stewardship
Kate Sellers, ARCADIS, Chelmsford, MA

Session 4 (1:30pm-5:30pm)
INTERNATIONAL SOIL & GROUNDWATER REMEDIATION CASE HISTORIES

Rm 168, Lower Level

Sponsored by **Remediation Partners**

Moderator: Richard Cartwright,
MECX, LP, East Amherst, NY

1:30pm
International In Situ Bioremediation Case History
Richard Raymond, Michael D. Lee, and Toru Chino, Terra Systems, Inc., Wilmington, DE

2:00pm
Use of High Resolution Site Characterization Tools to Optimize Remediation Performance
John Sohl, Columbia Technologies, Inc., Baltimore, MD

2:30pm
Increased In Situ Remediation Efficacy Via Innovative Injection Technology
Patrick Hicks, Wavefront Energy and Environmental, Limited, Raleigh, NC

3:00pm
Break

3:30pm
Design, Field Application, and Verification of Pneumatically Injected Permeable Reactive Barriers
Deborah Schnell, Pneumatic Fracturing, Inc., Alpha, NJ

4:00pm
Use of Waterloo Barrier Groundwater Containment Wall in Brownfields Redevelopment
Robbie Laird, C3 Environmental, Limited, Breslau, ON, Canada

4:30pm
International Metals Treatment Case History
James Barthel, Metals Treatment Technologies, Inc., Arvada, CO

5:00pm
International In Situ Chemical Oxidation Remediation Case History (Trento, Italy)
Richard Cartwright, MECX, LP, East Amherst, NY

Tuesday Workshops

6. Nanotechnology: Applications in Environmental Remediation
7:00pm – 9:00pm, Rm 163, Lower Level

7. LSP Board Disciplinary Case Workshop
6:30pm – 9:30pm, Rm 101, Lower Level

8. In-Situ Thermal Remediation
6:30pm – 9:30pm, Rm 168, Lower Level

Poster Sessions

4:00pm - 6:00pm, Rm 162 and 165, Lower Level

Authors Will Be Available For Individual Discussion At Their Posters, Tuesday & Wednesday.

Social

4:30pm - 6:00pm, Exhibit Hall

Refreshments and light hors d'oeuvres will be available.

Platform Sessions

Wednesday, October 20, 2010

Sessions Run Concurrently — **Wednesday Morning**

Session 1 (8:30am-12:00pm)
VAPOR INTRUSION I

Rm 163, Lower Level

Moderator: Ellen Moyer,
CH2M Hill, Montgomery, MA

8:30am
Assessment of Chlorinated Hydrocarbon Sources: Case Studies of Non-Groundwater Sources of Vapor Intrusion
Catherine G. Wanat, MA DEP, Springfield, MA

9:00am
Hydrocarbon and Oxygen Transport in the Vicinity of a Building Overlying a NAPL Source Zone
Hong Luo, Paul Dahlen, and Paul C. Johnson, Arizona State University, Tempe, AZ

9:30am
Vapor Intrusion Assessment – A Comparative Analysis of Subsurface Vapor Sampling Methods
Laurent C. Levy, Sanborn, Head & Associates, Inc., Westford, MA; David Shea, Head & Associates, Inc., Concord, NH; Daniel B. Carr, Head & Associates, Inc., Portland, ME

10:00am
Break

10:30am
Evaluating Vapor Intrusion as a Source of Petroleum Hydrocarbons to Indoor Air: A Case Study
Caroline B. Tuit, Eric L. Butler, and Kim R. Reid, Gradient Corporation, Cambridge, MA

11:00am
Transport and Biodegradation of Petroleum Hydrocarbon Vapor in the Subsurface: A Soil Column Study
Elsy A. Escobar, Paul Dahlen, and Paul C. Johnson, Arizona State University, Tempe, AZ

11:30am
Use of Stable Isotope Analysis to Distinguish Between Vapor Intrusion and Indoor Sources of VOCs
Thomas McHugh, GSI Environmental, Houston, TX; Kyle Gorder, Hill AFB; Stephanie Fiorenza, BP America; Richard Philp and Tomasz Kuder, University of Oklahoma; Joe Odencrantz and Harry O`Neill, Beacon Environmental, Bel Air, MD

Session 2 (9:00am-11:30am)
NAPL

Rm 101, Lower Level

Moderator: Tracy Roth,
LFR Inc., an ARCADIS Company, Manchester, CT

9:00am
Evaluating LNAPL Remedial Technologies for Achieving Project Goals
Pamela S. Trowbridge, Pennsylvania Department of Environmental Quality, Harrisburg, PA; Lily Barkau, Wyoming Department of Environmental Quality, Cheyenne, WY

9:30am
Soil Coring and Analysis Approach for Assessing Treatment Effects on LNAPL Smear Zones
Ben McAlexander, Trihydro Corporation, Ann Arbor, MI; Jim Gleason, Trihydro Corporation, Laramie, WY

10:00am
Break

10:30am
In Situ Chemical Oxidation (ISCO) for Reducing Emissions from Lower Permeability Zones to Groundwater Flowing Through More Permeable Zones
Bridget Cavanagh, Paul Dahlen, and Paul Johnson, Arizona State University, Tempe, AZ

11:00am
Integrating Heat with Biological, Chemical and Physical Processes for Soil and Groundwater Remediation
Mark Kluger, Dajak, LLC, Wilmington, DE

Session 3 (9:00am-12:00pm)
DEGRADATION OF POLYCHLORINATED BIPHENYLS

Reading Room, Concourse Level
Sponsored by **Kerfoot Technologies**

Moderator: William B. Kerfoot,
Kerfoot Technologies, Inc., Mashpee, MA

9:00am
Coated Micro to Nanobubble Ozone Reactivity and Field Treatment with PCPs, PAHs, and PCBs
William B. Kerfoot, Kerfoot Technologies, Inc., Mashpee, MA

9:30am
Pressure-Assisted Ozonation of PCB and PAH Contaminated Sediments
P.K. Andy Hong, University of Utah, Salt Lake City, UT

10:00am
Break

10:30am
Implementation of Ozone-based In-situ Remediation of a PCB and Total Petroleum Hydrocarbon Release
Jeffrey C. Dey, Imtiyaz A. Khan, and John M. Mateo, The Resource Companies, Moorestown, NJ

11:00am
PCBs in Building Material
Kimberly N. Tisa, U.S. EPA, Boston, MA

11:30am
Hudson River Dredging Project- Sediment Dewatering and Water Treatment
Scott Blaha and Tim Kruppenbacher, General Electric Company, Fort Edward, NY; Sid Archinal, Shaw Environmental & Infrastructure, Trenton, NJ; David Stahl, Shaw Environmental & Infrastructure, Latham, NY

AEHS ONLINE INFORMATION SESSION

Wednesday, October 20, 7:00pm-8:00pm, 168 Lower Level

Please join Dr. Paul Kostecki and Dr. David Ludwig, Director for Education and Training, AEHS Foundation for a special information session to discuss the Foundation's latest venture: Professional Education and Online Learning. We will be addressing questions related to online teaching and learning and encourage anyone interested in participating in, or potentially teaching for AEHS Online to attend.

Luncheon Speaker • Wednesday, October 20, 2010 • 12:00pm-1:30pm • Amherst Room, 10th Floor, Campus Center

WIRING MICROBES TO THE SUN: SUSTAINABLE ENERGY AND BIOREMEDIATION WITH MICROBE-ELECTRODE INTERACTIONS

Derek R. Lovley, *Department of Microbiology, University of Massachusetts, Amherst, MA*

The discovery that microorganisms can exchange electrons with electrodes has lead to many applications. Our most recent finding is the process of microbial electrosynthesis in which solar energy captured with photovoltaics is used to power microorganisms to fix carbon dioxide into organic carbon products that are excreted from the cell. The overall reaction of combining sunlight, water, and carbon dioxide to produce organic carbon is the same as photosynthesis but microbial electrosynthesis does not require arable land; does not have the pollution risks associated with intensive agriculture; and is much more efficient in producing desired products. Microbe-electrode processes have also been developed for accelerating the degradation of hydrocarbons in contaminated marine sediments; for enhancing reductive dechlorination solvents and chlorinated aromatics; and for promoting reductive precipitation of uranium from contaminated waters. An improving understanding of the mechanisms for microbe-electron electron exchange is providing the basic understanding needed to further optimize these energy and bioremediation applications.

Platform Sessions

Wednesday, October 20, 2010

Sessions Run Concurrently — **Wednesday Afternoon**

Session 1a (1:30pm-3:00pm)
VAPOR INTRUSION II

Rm 163, Lower Level

Moderator: Ellen Moyer,
CH2M Hill, Montgomery, MA

1:30pm
Statistical Analysis and Comparison of Indoor, Basement and Ambient Air Data Collected at Over 150 Homes between July 2004 and January 2010
Atul M. Salhotra, RAM Group of Gannett Fleming, Inc., Houston, TX

2:00pm
Designing Vapor Intrusion Remedies for a Wide Variety of Conditions –at a Single Site
William F. Simons, James R. Ash, and Ileen S. Gladstone, GEI Consultants, Inc., Woburn, MA; Laurence J. Welch Jr., GEI Consultants, Inc., Falmouth ME

2:30pm
Comparative Studies Involving Long-Term and Short-Term Organic Vapor Monitoring
Jack D. Fox and William H. Brew, Vapor Trail Analytics LLC, Rochester, NY

3:00pm
Break

Session 1b (3:30pm-5:30pm)
REGULATORY PANEL DISCUSSION - GRAPPLING WITH VAPOR INTRUSION

Rm 163, Lower Level

Moderator: Ellen Moyer,
CH2M Hill, Montgomery, MA

Panelists:
John Boyer, NJ DEP, Trenton, NJ
John Fitzgerald, MA DEP, Wilmington, MA
Robin Mongeon, NH Department of Environmental Services, Concord, NH
William Wertz, NYS DEC, Albany, NY
Carl Gruszczak, Jr., CT DEP, Hartford, CT

Session 2 (1:30pm-4:30pm)
PCBS

Rm 101, Lower Level

Moderator: Paul W. Locke,
MA DEP, Boston, MA

1:30pm
Exposure to PCBs from Waste Sites Via Consumption of Homegrown Produce
Greg Braun, MA DEP, Boston, MA

2:00pm
PCBs in Building Caulk – Health Hazard or Regulatory Over-Reaction?
James D. Okun, O'Reilly, Talbot & Okun Associates, Inc., Westborough, MA

2:30pm
Relationship between Sediment Morphology and PCB Contamination in the Acushnet River, New Bedford, Massachusetts
Michael Morris, Anita Rigassio Smith, and Joshua Cummings, Jacobs Engineering, New Bedford, MA; Dave Walsh, Woods Hole Group, E. Falmouth, MA

3:00pm
Break

3:30pm
Discovery, Assessment and Remediation of PCB-Contaminated Residential Fill Properties in Pittsfield, Massachusetts
John F. Ziegler and Joanne Flescher, MA DEP, Springfield, MA

4:00pm
Comparison of Analyzing and Quantifying Total PCBs by Different Methods at the New Bedford Harbor Superfund Site OU#3 Site
Mark R. Koenig and Bob Leitch, US Army Corps of Engineers, Concord, MA; Elaine Stanley, US EPA Region 1, Boston, MA

Session 3 (1:30pm-5:00pm)
ENVIRONMENTAL FORENSICS

Reading Room, Concourse Level

Moderator: Dallas Wait,
Gradient Corporation, Cambridge, MA

1:30pm
A Review of Current Technologies for the Development and Depiction of Conceptual Site Models-Legal and Technical Considerations
David Griffin, Griffin & Associates, San Diego, CA

2:00pm
Environmental Forensic Isotopes Support Chlorinated Solvent Investigation/Green Remediation
Yi Wang, Zymax Forensics, Escondido, CA

2:30pm
Potential Long-Term Environmental and Health Impacts of Tetraethyllead (TEL) on U.S. Urban Residential Areas
Richard Hurst, Hurst & Associates, Inc., Thousand Oaks, CA

3:00pm
Break

3:30pm
The Utility of BTEX for Evaluation of Petroleum Releases
Nathan Stevens, Christopher Johnson, Martin Hilfinger, and Raymond Leather, Cumberland Gulf Group of Companies, Framingham, MA

4:00pm
Forensic Use of Quantitative Indices of Hydrocarbon Weathering in Geochemical Investigations
Michael J. Wade, Wade Research, Inc., Marshfield, MA

4:30pm
Factors to Consider When Constraining the Time of Release of Gasoline LNAPL Based on Total Lead Concentration
Gregory S. Douglas, Steven D. Emsbo-Mattingly, Scott A. Stout, Allen D. Uhler, and Kevin J. McCarthy, NewFields Environmental Forensics Practice, Rockland, MA

Session 4 (1:30pm-4:30pm)
SITE REMEDIATION – DIAGNOSTICS, IN-SITU TREATMENT, AND VAPOR INTRUSION

Rm 168, Lower Level
Sponsored by **Regenesis**

Moderator: Maureen Dooley,
Regenesis, Wakefield, MA

1:30pm
The Use of RegenOx based ISCO as a Mass Reduction Technology
David S. Peterson, Regenesis, Red Hook, NY; Maureen Dooley, Regenesis, Wakefield, MA

2:00pm
Practical Applications of In Situ Microcosm Studies as a Predictive Tool
Matthew Burns, WSP Environment & Energy, Woburn, MA; Colleen Myers, WSP Environment & Energy, Cuyahoga Falls, OH; Glen Rieger, WSP Environment & Energy, Pittsburgh, PA

2:30pm
Treatment of MTBE in Groundwater Using Chemical Oxidation and Enhanced Bioremediation
Rick G. McGregor, Vertex Environmental, Inc, Cambridge, ON, Canada

3:00pm
Break

3:30pm
BioChemical Treatment of a Hydraulically Complex Hexavalent Chromium Plume
Richard J. Desrosiers, GZA GeoEnvironmental, Bloomfield, CT; I. Richard Schaffner, GZA GeoEnvironmental, Manchester, NH

4:00pm
Vapor Intrusion Mitigation Approaches in a Retrofit Application using a Chemical Resistant Barrier
Scott Freeman, Cedarview Projects, Inc., Reading, MA; Kelly Ameli, Land Science Technologies, San Clemente, CA

Wednesday Workshops

10. In-Situ Chemical Oxidation
6:30pm – 9:30pm, Rm 163, Lower Level

11. Incorporating Green into the Cleanup Dialogue: The Green Remediation, Sustainable Remediation and Green Chemistry Workshop
7:00pm – 9:00pm, Rm 101, Lower Level

Poster Sessions

4:00pm - 6:00pm, Rm 162 and 165, Lower Level
Authors Will Be Available For Individual Discussion At Their Posters, Tuesday & Wednesday.

WINE RECEPTION

Wednesday, 5:00pm - 7:00pm, Exhibit Hall — ***Sponsored by***

Wine, refreshments, and light hors d'oeuvres will be available • Free to all registered conference attendees • Exhibits will be open

Platform Sessions

Thursday, October 21, 2010

Sessions Run Concurrently — **Thursday Morning**

Session 1 (9:00am-12:00pm)
BIOREMEDIATION

Rm 163, Lower Level

Moderator: Matthew Burns,
WSP Environment & Energy, Woburn, MA

9:00am
The Nature of Subsurface Dissolved Oxygen
Marcia J. Berger, Isaac Anderson, and Leonard V. Rappoli, Clean Properties, Inc., Sudbury, MA

9:30am
Expediting Site Closure of a 1,1,1-TCA Plume Using In Situ Bioremediation
Brian J. Cote, Shaw Environmental & Infrastructure, Inc., Stoughton, MA; Tarek Ladaa, Shaw Environmental & Infrastructure, Inc., Knoxville, TN; Ray Larkin, Philips Electronics North America Corporation, North Kingstown, RI

10:00am
Break

10:30am
Using Blended Substrate Formulations to Enhanced Reductive Dechlorination
Michael R. Sieczkowski, JRW Bioremediation, L.L.C., Lenexa, KS

11:00am
Combining Bioaugmentation Cultures to Treat Complex Mixtures of High-Concentration Volatile Organic Compounds – Bench Test Findings
Chris Voci, Geosyntec Consultants, Lawrenceville, NJ; Neal Durant, Geosyntec Consultants, Columbia, MD; Jeff Roberts, SiREM Laboratory, Guelph, ON, Canada

11:30am
Use of Positron Emission Tomography to Study Radionuclide Biomineralization and Sequestration in Oxygenated Subsurface Soils
Karen Kinsella, David J. Schlyer, and Joanna S. Fowler, Brookhaven National Laboratory, Upton, NY; Robert J. Martinez and Patricia A. Sobecky, University of Alabama, Tuscaloosa, AL

Session 2 (8:30am-12:00pm)
HEAVY METALS

Rm 101, Lower Level

Moderator: Peter Woodman,
Risk Management Incorporated, Acton, MA

8:30am
An Analytical Differentiation between Elemental and Total Mercury and Its Application in Remedial Evaluation
Donna M. Davis, Adam P. Chen, Joan V. Gonzalez, and Ivan G. Williamson, Burns & McDonnell Engineering, Inc., Downers Grove, IL

9:00am
In Situ Chemical Reduction for Groundwater Chromium Stabilization
John Valkenburg, Adventus Americas, Inc., DeWitt, MI; Josephine Molin, Adventus Americas Inc., Freeport, IL; Andrzej Przepiora, Enviromental Technologies, Inc., Waterloo, ON, Canada,

9:30am
Gender Effects of a Chemical Mixture of Toluene, Trichloroethylene and Phenol on the Dermal Bioavailability of Nickel in Pig Skin
Mohamed S. Abdel-Rahman and Rita M. Turkall, New Jersey Medical School, Newark, NJ

10:00am
Break

10:30am
Treatability Testing of Chromium-Impacted Groundwater with Zero-Valent Iron and Siderite
Cherilyn Carrara, Thomas A. Krug, and Cory Repta, Geosyntec Consultants, Guelph, ON, Canada

11:00am
Analysis of the Occurrence of Barium, Selenium and Silver in Natural and Historic Fill Soils
William R. Swanson, CDM, Inc., Cambridge, MA

11:30am
Treatment of Arsenic-Contaminated Materials Using Selected Stabilization and Solidification Technologies
Paul M. Randall, U.S. EPA, Cincinnati, OH

Session 3 (8:00am-12:00pm)
FATE & TRANSPORT

Reading Room, Concourse Level

Moderator: Kathy Creighton,
Shaw Group, Stoughton, MA

8:00am
Greenhouse Gas Emissions Modeling: A Tool for Federal Facility Decommissioning
Karen L. Petho, Christopher D. Zevitas, Adam F. Klauber, and Jonathan D. Cybulski, USDOT/Volpe Center, Cambridge, MA

8:30am
Monitoring of an Ethanol Released into Gasoline Residuals Using High Frequency Ground Penetrating Radar
John D. Mosquera, Juliana G. Freitas, and Anthony L. Endres, University of Waterloo, ON, Canada

9:00am
Remediation Optimization with Optical Screening Tools
Randy St. Germain, Dakota Technologies, Inc., Fargo, ND

9:30am
Development of a Mobile Laboratory System for Site Characterization and Analysis of Subsurface Contaminants
Ala'a Ismail, Majid Al-Rasheedi, and Michael Quinn, Kuwait Institute for Scientific Research, Safat, Kuwait

10:00am
Break

10:30am
Optimization of a Large Pump and Treat System at the Massachusetts Military Reservation
Paul S. Nixon, Army Environmental Command Impact Area Groundwater Study Program, Camp Edwards, MA; Michael Kulbersh, Army Corps of Engineers, Concord, MA

11:00am
Fate of Ethanol Fuels in the Source Zone and Implications to Downgradient Transport
Juliana G. Freitas and James F. Barker, University of Waterloo, ON, Canada

11:30am
Simulation of Pilot Scale In Situ Fixation of a Hexavalent Chromium Plume at the Puchack Well Field Superfund Site
Matthew Gamache and Robert P. Schreiber, CDM, Inc., Cambridge, MA; Frank Tsang, CDM Inc., New York, NY

Luncheon Speaker • Thursday, October 21, 2010 • 12:00pm-1:30pm • Amherst Room, 10th Floor, Campus Center

UPDATE ON THE HUDSON RIVER DREDGING PROGRAM

Tim Kruppenbacher
Operations Manager, GE Corporate Environmental Program, Fort Edward, NY

This presentation will describe the recent dredging test project and review the results and next steps.

Platform Sessions

Thursday, October 21, 2010

Sessions Run Concurrently — **Thursday Afternoon**

Session 1 (1:30pm-4:30pm)
INNOVATIVE AND ALTERNATIVE REMEDIAL TECHNOLOGIES

Rm 163, Lower Level

Moderator: Scott Saroff,
Michael Baker, Jr., Moon Township, PA

1:30pm
Effects of Cometabolism on Aerobic 1,2-dibromoethane Degradation
Kyunghwa Baek, Robert McKeever, Kahlil Rieber, Diane Sheppard, Chul Park, and Klaus Nüsslein, University of Massachusetts, Amherst, MA; Sarina J. Ergas, University of South Florida, Tampa, FL; Rose Forbes, HQ AFCEE, Otis ANG Base, MA; Mark Hilyard, CH2M HILL, Otis ANG Base, MA

2:00pm
Treatment of "MGP" Groundwater Contaminated With Complexed Cyanides, Heavy Metals and Various Organics Using a Three Stage Ozone Advanced Oxidation Process
L. Joseph Bollyky, Bollyky Assoc., Inc, Stamford, CT; Lance A. Downs, Advanced Remediation Tech. Inc., Canby, OR

2:30pm
Moving from Ex Situ to In Situ Remediation: Improved Subsurface Injection & Hydro-Fracturing Technologies – It's a Contact Sport
John V. Fontana and Vincent E. Barlock, Vista GeoScience, Golden, CO; Seth Hunt, Foremost Solutions, Lakewood, CO

3:00pm
Break

3:30pm
Evaluation of Two Methods of In Situ Treatment in Fractured Bedrock at a Residential Fuel Release Site
Geoffrey A. Brown, Andrew W. Fiedler, and Roger P. Thibault, ENPRO Services, Inc., Newburyport, MA; Raymond G. Ball and Jim Elsenbeck, EnChem Engineering, Inc., Newton, MA

4:00pm
Applications and Benefits of Groundwater Recirculation for Electron Donor Delivery and pH-Adjustment During Enhanced Anaerobic Dechlorination
David Falatko, Innovative Engineering Solutions, Inc, South Portland, ME; Sami A. Fam, Innovative Engineering Solutions, Inc., Walpole, MA; George Pon, Bioremediation & Treatability Center, Walpole, MA

Session 2 (1:30pm-5:30pm)
SITE ASSESSMENT/FIELD SAMPLING

Rm 101, Lower Level

Moderator: Cosmo Gallinaro,
Common Sense Environmental, Inc., New Bedford, MA

1:30pm
Incremental Sampling – A Case History of Site Characterization and Cleanup Verification
Mark C. Gemperline, MCG Geotechnical Engineering, Inc., Morrison, CO

2:00pm
Computer Assisted Data Management and the Triad Approach: A Case Study Addressing Problems and Potentials for Successful Remedial Investigations
Arnold L. Gray, EarthSoft, Inc., Sterling, MA; Jason C. Ruf, S2C2, Inc., Raritan, NJ

2:30pm
Angle Drilling, ISCO, and Groundwater Recovery to Address a Fuel Oil Release Beneath a School
Geoffrey A. Brown and Michael E. Coty, ENPRO Services, Inc., Newburyport, MA; Denis D'Amore, D'Amore Associates, Inc., Lancaster, MA

3:00pm
Break

3:30pm
Application of Triad Approach during Investigation, Planning, and Remediation at an NPL Site
Jason D. McNew, EA Engineering, Science, and Technology, Edgewood, MD

4:00pm
High Resolution Site Characterization
Seth Pitkin, Stone Environmental, Inc., Montpelier, VT

4:30pm
Extracting VOCs from Low Permeability and/or High Organic Carbon Content Soil Matrices: Challenges and Solutions
Michael Rossi, Stone Environmental, Inc., Montpelier, VT

5:00pm
Using Innovative Technologies Such as XRF, RTS/GPS, and GIS to Conduct Dynamic Investigations, Remedial Actions, and Waste "Pre-Characterization" on Government and Commercial Projects
Randy McBride, Shaw Environmental and Infrastructure, Inc., Knoxville, TN

Session 3 (1:30pm-4:30pm)
ADVANCED TOOLS

Rm 168, Lower Level

Moderator: Tracy Roth,
LFR Inc., an ARCADIS Company, Manchester, CT

1:30pm
Use of Stable Isotope Analysis to Assess Biodegradation of Gas-Phase Volatile Organic Compounds in the Unsaturated Zone
Daniel Bouchard and Daniel Hunkeler, University of Neuchatel, Neuchatel, Switzerland; Patrick Höhener, Université de Provence, Marseille, France; Fabien Cornaton, Tecnológico de Monterrey, Monterrey, México

2:00pm
Confirming Contaminant Destruction and Optimizing In Situ Chemical Oxidation Application Using Compound Specific Isotope Analysis
Matthew Burns, WSP Environment & Energy, Woburn, MA; Robert J. Pirkle, Microseeps, Inc., Pittsburgh, PA

2:30pm
Reactive Fluorinated Substrate Analogs for Characterizing MTBE and TBA Biodegradation
Michael R. Hyman, Alan House, and Jeff Massey, North Carolina State University, Raleigh, NC

3:00pm
Break

3:30pm
A Multi-component Natural Gradient Tracer Study in Support of the Forensic Analysis of an Oxygenated Gasoline Release
Joseph E. Haas II, New York State Department of Law, New York, NY; Dan Cornacchiulo, Environmental Assessment and Remediations, Patchogue, NY; Dominique Sorel, S.S. Papadopulos & Associates, Inc., Montreal, Quebec, Canada

4:00pm
Applications of Stable Isotopes to a Petroleum Site
Gerard Spinnler, Shell Global Solutions (US) Inc, Houston, TX

STUDENT AWARD

ADVENTUS

We are proud to announce the 7th consecutive year of the

Adventus Americas Student Awards

for best platform and poster presentation

AEHS Foundation

$1000 each will be awarded to the two best student presentations.
Winners will be announced at the Thursday luncheon.

Poster Sessions

Authors will be available for individual discussion at their poster(s) from 4:00pm – 6:00pm each day

ANALYSIS

An Analytical Strategy for Distinguishing Differences Between JP-4 and JP-8 Jet Fuels Using Primary Hydrocarbon Constituents
Peter J. Cagnetta and Heather L. Steffe, SAIC, Harrisburg, PA; Alan Klavans, Air National Guard, Andrews Air Force Base, MD

The Evaluation of Sampling Efficiency of Polychlorinated Biphenyls as AROCLOR 1242, 1248, 1254 and 1260 Using Polyurethane Foam (PUF) Sampling and Analysis by USEPA Method 8082 GC/ECD
Ann C. Casey, Robert E. Wagner, Anthony Maiello, and Carrie Barss, Northeast Analytical, Inc., Schenectady, NY

Environmental Analysis and Water Quality Exposure Monitoring of Environmental Waters using an In Vitro Bioassay System in Nara II
Akiyoshi Sawabe, Katsuaki Sasai, Kazuki Ikushima, Ryuji Takeda, and Akira Iida, Kinki University, Nakamachi, Japan; Shiho Kageyama, Ryo Kamata, Daisuke Nakajima, and Fujio Shiraishi, National Institute for Environmental Studies, Ibaraki, Japan

ARSENIC

Laboratory and Field Experiments on Microbial Transformation of Arsenic
Claudia Gallert, Dominik Freikowski, and Josef Winter, Karlsruhe Institute of Technology, Karlsruhe, Germany

Comparison Between XRF and Atomic Absorption Spectroscopy for the Determination of Total Arsenic in Soil
Cielito DeRamos King, Bridgewater State College, Bridgewater, MA

Arsenic Treatment Plant Limitations and Upgrades
David Reault, Fred Santos, and Willard Murray, ECC, Marlborough, MA; Robert Simeone, BRAC Environmental Office, Devens, MA

Structural Alteration of an Aquatic Macrophyte Community Along a Gradient of Arsenic Concentrations: Implications for Habitat Quality
John D. Schaffer, Tetra Tech EC, Inc, Morris Plains, NJ

CHEMICAL OXIDATION

"Real-Time" Treatment Optimization Utilizing In Situ Chemical Oxidation
Will Moody and Dan Bryant, Geo-Cleanse International, Inc., Matawan, NJ; Eric Schlauch, Hudson Environmental Services, Inc., Somerville, NJ

Residual Persulfate and How it Affects Post-ISCO Performance Evaluation
Richard Purdy, Paul M. Dombrowski, and Barbara A. Weir, AECOM Environment, Wakefield, MA; James Brown, US EPA, Boston, MA

ENERGY

Combining Subsurface Exploration Technologies to Support Electric Utility Modernization
Erin Kirby, Robert Clemens, and Peter King, Golder Associates, Inc., Manchester, NH; Brent Sowle, Public Service of New Hampshire, Bow, NH

Home Owner Survey of Their Photovoltaic Systems in Virginia
Douglas Mose, George Siaway, and James Metcalf, George Mason University, Fairfax, VA

Renewable Energy from Landfill Gas, Wind Power and Solar Energy on a Former Landfill Site
Josef Winter and Claudia Gallert, Karlsruhe Institute of Technology, Karlsruhe, Germany

ENVIRONMENTAL FATE & MODELING

Application of Vadose Zone Modeling to Evaluate Remedial Alternatives at a Shooting Range in New Jersey
Liliana Cecan, Langan Engineering & Environmental Services, Doylestown, PA; Chris Neuffer, EnviroTactics; Robert Schneiker, Environmental Software Consultants, Inc.

Studying Rocket Fuel Components' Migration in Soils Under the Conditions of Field Model Experiment
Pavel Krechetov, T.V. Koroleva, and O.V. Chernitsova, Lomonosov Moscow State University, Moscow, Russian Federation

GENERAL

The Dredging of the Lower Niger River - How NDES Communications Effort Influenced It
Moses Braimah, Nigeria Environmental Society, Nigeria

Qualitative and Quantitative Assessment of Oxide Layers of Steam Lines in Industrial Boilers
Neda Deris and Mahmoud Paykari, Abadan Institute of Technology, Bovarde Shomali, Iran

Utilization of Waste Water, Soils, Rocks as a Fuel in the Transportation via Rkees Hill Train
Rijan Karkee, Nobel Academy Higher Secondary School, Kathmandu, Nepal

Process-Driven Beneficial Re-Use of Decommissioning and Demolition Debris: Integration into Site Redevelopment
James M. Marcus and Daniel O. Wybenga, S&ME, Inc., Spartanburg, SC; Ashley E. Sapyta, S&ME, Inc., Greenville, SC

Fluorisis Mitigation: An Integrated Approach
Gopal Pathak, Birla Institute of Technology, Mesra, Ranchi, India

Assessing the Relationship between Methane Gas and Barometric Pressure at Shepley's Hill Landfill - Former Fort Devens in Ayer, MA
Fred Santos, Willard Murray, and David Reault, ECC, Marlborough, MA; Robert Simeone, BRAC Environmental Office, Devens, MA

HEAVY METALS

Mercury Pollution Near a Chlor-Alkali Plant in Northern Kazakhstan
Paul M. Randall, U.S. EPA, Cincinnati, OH

Surfactant Facilitated Remediation of Heavy Metal Contaminated Soils: Efficacy and Ecotoxicological Consequences
Ilya B. Slizovskiy and Jason W. Kelsey, Muhlenberg College, Allentown, PA; Paul B. Hatzinger, Shaw Environmental, Inc., Lawrenceville, NJ

Heavy Metal Accumulation of *Phytolacca americana* Hairy Root
Ryuji Takeda, Masato Tomita, Akira Iida, and Akiyoshi Sawabe, Kinki University, Nakamachi, Japan

LEGAL ISSUES/ ENVIRONMENTAL FORENSICS

Managing Evidence from Polluter Pay Principle to Owner Pay Principle: What Contribution from Environmental Forensics
Jean Francois David, Expert près la Cour d'Appel de Versailles, Garches, France

Put Comprehensive Enterprise Environmental Risk Management to Work for You
John G. Nevius, Anderson Kill & Olick, P.C., New York, NY

Protect Yourself and Your Clients: Insurance 101 for Environmental Professionals
John G. Nevius, Anderson Kill & Olick, P.C., New York, NY

Climate Change Liability: Are You Covered?
John G. Nevius, Anderson Kill & Olick, P.C., New York, NY

NAPL

Expedited Large Scale NAPL Plume Removal Utilizing Mobile Remediation Solutions
Jeff Brammer, EcoVac Services, Moore, OK; Nick Athens, EcoVac Services, Woodstock, GA

Assessment of the Natural Attenuation of NAPL Source Zones and Post-Treatment NAPL Source Zone Residuals
Ryan Ekre, Paul C. Johnson, and Paul Dahlen, Arizona State University, Tempe, AZ; Bruce Rittman and Rosie Kramalnik-Brown, Biodesign Institute at Arizona State University, Tempe, AZ

Evaluation of LNAPL Specific Thickness to Assist in Remedy Selection
Sam J. Smith, Maura E. Maloney, and Lingke Zeng, Shaw Environmental and Infrastructure, Inc., Knoxville, TN

REMEDIATION

Power Plant and MGP Sites Remediated Economically With Organoclay
George Alther, Biomin, Inc., Ferndale, MI

Case Studies of In Situ Remediation of Chlorinated and Hydrocarbon Impacted Sites Using Hydraulic Fracturing Technologies
Vincent E. Barlock and John V. Fontana, Vista GeoScience, Golden, CO; Scott D. Andrews, Essential Management Solutions (EMS), Evergreen, CO; Sara Handy, ARCADIS, Lakewood, CO

Soils/Sediments Treatment Processing Technologies
James Barthel, MT2, LLC, Arvada, CO

Is Environmental Remediation Static or Dynamic: Case Studies
Nazmul Haque, Leslie D. Schultheis and Apurva Patil, Kleinfelder, Hanover, MD

Chemical Treatment of PCB Contaminated Soils
Agnes Morrow, Victor F. Medina, and Scott Waisner, U.S. Army Engineer Research & Development Center, Vicksburg, MS; Charles Coyle, U.S. Army Corps of Engineers

Assessing Rates of Biochemical Degradation for Chlorinated Solvents Using Laboratory and Field-Based Techniques
Jonathan Ordway, Sanborn, Head & Associates, Inc., Portland, ME; David Shea, Sanborn, Head & Associates, Inc., Concord, NH

Linear Infiltration Landscapes Along Urban Streets - A Comparative Review of Aesthetic Values and Utility Objectives
Frank Sleegers, University of Massachusetts, Amherst, MA; Daniel Roehr, The University of British Columbia, Vancouver, BC, Canada

EHC® In Situ Chemical Reduction Technology for In Situ Treatment of Chlorinated Volatile Organic Compounds
Ravikumar Srirangam and Fayaz Lakhwala, Adventus Americas, Inc., Union, NJ; Jim Mueller, Adventus Americas Inc., Freeport, IL

EHC-O®: Oxygen Releasing Compounds for In Situ Bioremediation of Petroleum Hydrocarbons
Ravikumar Srirangam and Fayaz Lakhwala, Adventus Americas, Inc., Union, NJ; Jim Mueller, Adventus Americas Inc., Freeport, IL

PCE Source Zone Remediation at the Orlando Events Center Brownfield Site
Stephanie Turkot and Will Moody, Geo-Cleanse International, Inc., Matawan, NJ; Ed Kellar, MACTEC Engineering and Consulting, Inc., Newberry, FL; Barry Robertson, Stillwater Technologies, Orlando, FL; Alan Oyler, City of Orlando, Orlando, FL

An Effective In Situ Air Stripping Approach for Treatment of 1,4-Dioxane in Groundwater
Omer J. Uppal, Bruce L. Cliff, Michael C. Marley, and Scott C. Crawford, XDD, LLC, Stratham, NH

Surfactant Enhanced Soil Washing of Oil and Gas Wastes Tank Bottom Sludge, Drilling Cuttings, Oil Sands and Impacted Soils with Associated Oil Recovery Opportunities North and South American Case Studies
Paul Wierbicki, Ivey International, Inc., Lower Kingsclear, NB, Canada; George A. Ivey, Ivey International, Inc., Campbell River, BC, Canada

RISK ASSESSMENT

Novel Continuous Ground-Gas/VOC Monitoring and Improved Risk Assessment
Geoff Hewitt, ION Science (Americas) LLC, Waterbury, VT; Peter Morris, University of Manchester, Manchester, UK

SEDIMENTS

Sediment Quality Triad Approach for Temporal-Spatial Assessment of Marine Sediment at McAllister Point Landfill
Jackson H. Kiker and Fred Santos, ECC, Marlborough, MA; Winoma A. Johnson, NAVFAC MIDLANT, Norfolk, VA

New Sediment Remediation Technology Results From A Confined Space Project For Knolls Atomic Power Laboratory
Thomas J. Kryzak, Environmental Lunch Box Technology, Altamont, NY

SITE ASSESSMENT

Ambient Concentrations of Polycyclic Aromatic Hydrocarbons in Soil, Fullerton, California
Walter R. Crone, Ninyo & Moore Geotechnical and Environmental Sciences Consultants, Irvine, CA

Laboratory Validation of the GORE™ Passive Water Sampler
James E. Whetzel and Don D'Apolito, W. L. Gore & Associates, Inc., Elkton, MD

SUSTAINABLE REMEDIATION

Sustainable Soil Upgrading by Developing Cost-effective, Biogeochemical Remediation Approaches
Nerea Otaegi and José Enrique Vadillo, LABEIN – Tecnalia, Derio, Spain; Leen Bastiaens, Vlaamse Instelling Voor Technologisch Onderzoek, N.V. (VITO), Mol, Belgium; Pauline Van Gaans, DELTARES/TNO, Utrecht, Netherlands; Tim Grotenhuis, Wageningen University and Research Centre, Wageningen, Netherlands; Janusz Kupranek, Instytut ekologii terenow Uprzemyslowionych (IETU), Katowice, Poland; Lennart Larsson, Statens Geotekniska Institut (SGI), Göteborg, Sweden

Sustainable Stream Restoration of a Semi Urban Creek near a Superfund Site, NY
Sivaramakrishnan Sangameswaran, Bioengineering Group, Inc, Tallahassee, FL; Doug J Smith and Wendi Goldsmith, Bioengineering Group, Inc, Salem, MA

Ecologically Sensitive Geotechnical Engineering Solution for an Urban Landfill Site on Mill Creek, Cincinnati, OH
Sivaramakrishnan Sangameswaran, Bioengineering Group, Inc, Tallahassee, FL; Duke Bitsko and Wendi Goldsmith, Bioengineering Group, Inc, Salem, MA

Simultaneous Oxidative Reductive Chemical Treatment of PAH Contaminated Soils at a Former Manufactured Gas Plant (MGP) Site Using a New Innovative Green Remediation Technology
Paul Wierbicki, Ivey International, Inc., Lower Kingsclear, NB, Canada; George A. Ivey, Ivey International, Inc., Campbell River, BC, Canada; Andrew Wollen, Environmental Remediation Resources Pty Ltd, Moorabbin, Australia

VAPOR INTRUSION

Integrated Field-Scale, Lab-Scale, and Modeling Studies for Improving the Ability to Assess the Groundwater to Indoor Air Pathway at Chlorinated Solvent-Impacted Groundwater Sites
Chase Holton, Hong Luo, and Paul Dahlen, Arizona State University, Tempe, AZ; Kyle A. Gorder, Hill Air Force Base, Ogden UT

Modeling the Effects of Natural Weather Conditions on Temporal Variability in Indoor Air Concentrations at Vapor Intrusion Sites
Hong Luo and Paul C. Johnson, Arizona State University, Tempe, AZ

Changes in Radon Concentrations Due to Changes in Water Table Depth
Douglas Mose, George Mason University, Fairfax, VA

2010 Lifetime Achievement Awards

The Annual International Conference on Soils, Sediments, Water, and Energy is pleased to announce the recipients of the Lifetime Achievement Award. This award is presented to individuals in the areas of industry, academia, government, and military, who have made significant contributions to the understanding and solution of soil, sediment, and groundwater pollution problems. This year's winners are **Stephen Koenigsberg**, *The Adventus Group, in the area of industry;* **David Brown**, *Fairfield University, in the area of academia;* **Glenn Suter**, *US EPA, in the area of government; and* **Leslie Karr**, *NAVFAC ESC, in the military sector.*

INDUSTRY

Stephen S. Koenigsberg, Ph.D. is Vice President of The Adventus Group in Irvine, California. He has 25 years of environmental remediation experience and is a recognized developer of widely used products and technologies. In addition to continuing in these activities for Adventus, Koenigsberg specializes in the emergent field of expedited site closure. This practice helps define a novel vendor model whereby product recommendations are integrated with suggestions for the use of molecular biological and isotopic diagnostics. This synergy can guide the formation of optimized site management and closure strategies and supports the consultant's role in achieving cost-effective results for their clients.

Koenigsberg was a Founder of Regenesis in 1994, where he co-invented and developed the company's products through 2006; they have been applied to over 15,000 sites world-wide. One of the products, MRC®, received a Second Place Award from the *Wall Street Journal* for Technology Innovation in 2004. Before joining Adventus, Koenigsberg was a Principal at ENVIRON International Corporation.

Dr. Koenigsberg has worked as a project team member on numerous sites involving *in-situ* and on-site treatment protocols and has published over 150 technical articles focusing on bioremediation and environmental biotechnology. Koenigsberg received his M.S. and Ph.D from Cornell University. He is a member of several editorial and advisory Boards and is an adjunct professor at The California State University at Fullerton where he also serves as Chairman of the Dean's Advisory Council.

ACADEMIA

David R. Brown, Sc.D. lives in Westport, Connecticut. He is a graduate of Cornell University (B.S.), The University of California at Berkeley (MS) in Environmental Health and of the Harvard School of Public Health, Sc.D. Physiology/Toxicology. Married, he has two children and three grandchildren. Dr. Brown is founding member of Environment and Human Health Inc and an adjunct faculty member of the Applied Ethics Department at Fairfield University in Fairfield Connecticut where he teaches courses in Ethics and the Environment. David Brown is a Public Health Toxicologist who has worked in Academic, the Public and Private sectors. He is past Chief of Environmental Epidemiology and Occupational Health in the Connecticut Department of Health and previously was Associate Professor of Toxicology at Northeastern University, College of Pharmacy and Allied Health. He has served as Deputy Director of The Public Health Practice Group of ATSDR at the National Centers for Disease Control and Prevention in Atlanta, Georgia and as a consulting toxicologist with the North East States for Coordinated Air Use Management (NESCAUM). He is presently Director of Public Health Toxicology at Environment and Human Health Inc. Dr. Brown is a founding board member of Environment and Human Health Inc, a nonprofit organization dedicated to the protecting public health from environmental harms through research, education and promotion of sound public policy. Dr. Brown has extensive research in Toxicology and in Risk Assessment, Most recently he has written editorials and reports that address the ethical implication of regional and national environmental public health policy decisions. Dr Brown's current research is focused on reduction of childhood exposures to toxics in air, water and in consumer products. He founded the toxicology programs at The University of Maryland School of Pharmacy and at Northeastern University. His early research focused on the effects of heavy metals on the development of the nervous system.

GOVERNMENT

Glenn W. Suter II is Science Advisor in the U.S. Environmental Protection Agency's National Center for Environmental Assessment-Cincinnati. He has a Ph.D. in Ecology from the University of California, Davis, and 32 years of professional experience including 27 years of experience in ecological risk assessment and ecological epidemiology. He is the principal author of three texts in the field of ecological risk assessment, editor of three other books and author of more than two hundred other publications. He is Associate Editor for Ecological Risk of *Human and Ecological Risk Assessment*, and Reviews Editor for the Society for Environmental Toxicology and Chemistry (SETAC). He has served on the International Institute of Applied Systems Analysis Task Force on Risk and Policy Analysis, the Board of Directors of SETAC, an Expert Panel for the Council on Environmental Quality, and the editorial boards of five journals. He is the recipient of numerous awards and honors; most notably, he is an Elected Fellow of the American Association for the Advancement of Science; and he received SETAC's Global Founder's Award, their award for career achievement, and the EPA's Level 1 Scientific and Technical Achievement Award. His research experience includes development and application of methods for ecological risk assessment and ecological epidemiology, development of soil microcosm and fish toxicity tests, and environmental monitoring. His work is currently focused on the development of methods for determining the causes of biological impairments.

MILITARY

Leslie A. Karr, P.E. is a graduate of the University of Southern California, Los Angeles, CA, with an MS in Environmental Engineering and a BS in Biological Sciences. She began her Federal career working at the Naval Civil Engineering Laboratory (now known as the Naval Facilities Engineering Service Center) in Port Hueneme, CA as a Research Environmental Engineer. Over the past 30 years she has been the principle investigator for numerous projects, including Beneficial Reuse of Dredged sediments, Leak Detection for Bulk USTs & ASTs, Hydrocarbon National Test Site, Depleted Uranium Characterization on test ranges, Long-term Disposition of Seafloor Cables and the Defense Coastal/Estuarine Research Program. She was a past recipient of the SAME Engineer of the Year, the NFESC Engineer of the Year, and the NAVFACENGCOM Engineer of the Year. Leslie currently serves as the Program Director for the Navy Environmental Sustainability Development to Integration (NESDI) research program, sponsored by the Chief of Naval Operations. NESDI is the Navy's RDT&E program for shoreside environmental compliance, pollution prevention, cleanup, conservation, range sustainability, and port operations.

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2010 Scientific Contributions and Foundation Appreciation Award

In addition to the Lifetime Achievement Awards, the Foundation has created the Scientific Contributions and Foundation Appreciation Award which is given to those individuals who have generously provided their intellectual, physical, and emotional energies to the Foundation's myriad of activities. Because of their active participation and outstanding scientific contributions to the field, we are proud to announce this year's recipients, **Arthur L. Baehr,** *US Geological Survey and* **Henry H. Tabak,** *US EPA retiree.*

Arthur L. Baehr worked as a hydrologist for the U.S. Geological Survey for 25 years. He has a B.S. in Mathematics and an M.S. in Environmental Science from Drexel University, and a PhD. in Civil Engineering from the University of Delaware. His PhD dissertation: Immiscible Contaminant Transport in Soils with an Emphasis on Gasoline Hydrocarbons was selected as the best Environmental Engineering Dissertation of 1985 by the Association of Environmental Engineering Professors. Dr. Baehr worked on a broad range of hydrologic investigations. Methods he developed include: gas transport to quantify natural attenuation at gasoline spill sites, vapor extraction remediation design, evaluation of MTBE in the hydrologic cycle, techniques to determine the spatial variability of recharge, and the partitioning of nitrogen and pesticides in agricultural watersheds. A unifying theme of these studies is the development of methods to obtain field scale data and of mathematical modeling to relate unsaturated zone processes to ground water contamination. He effectively parlayed academic programs with his research projects at USGS, most notably with the University of Connecticut, Drexel and Villanova Universities. Currently he is employed with the Pennsylvania DEP as an Energy Program Specialist where he helps manage solar, wind, and biogas renewable energy projects initiated by the Federal Stimulus Program.

Henry H. Tabak retired in 2006 from his position as a Senior Research Chemist in charge of bioremediation of soils and sediments research studies in the Land Remediation and Pollution Control Division, National Risk Management Research Laboratory, USEPA, Cincinnati, OH. He has over 46 years of research experience in USEPA and its predecessor organizations in the area of microbial degradation of toxic organic pollutants in Aqueous, soil and sediment systems, and in metabolic pathways of biodegradation. Mr. Tabak received a B.S. degree in biology and chemistry from New York City University (CCNY) and an M.S. degree in microbiology from University of Kentucky. Pursued studies towards a Ph.D. degree in microbial physiology and chemistry at the University of Michigan and the University of Wisconsin as part of a USPHS fellowship awarded to him in 1962-1964.

Research Specialties and Extensive Research Experience are in the following areas:
Aerobic and anaerobic biodegradability studies with RCRA priority toxic pollutants, bioaugmentation studies for enhancement of wastewater and soil contaminant biodegradation, development of biotreatability testing protocols, biosystem approaches and technologies for treatment of toxic organics in soils and sediments, electrolytic respirometry methods for determination of biodegradability of toxic pollutant, development of chemical indices of human and agricultural waste pollution, and biodegradation of organic toxic pollutants by white rot fungi.

Most recent research activities included studies for determining bioavailability, biodegradability and toxicity of soil and sediment organic contaminants, development of nutrient delivery systems, biostimulation and bioaugmentation methods for the enhancement of bioremediation of contaminated sediments and soils, acid mine drainage treatment technology research dealing with biokinetics of sulfate reduction by sulfate reducing bacteria (SRB); biosorption of heavy metals on biosorbents, toxicity and inhibition of heavy metals from acidic wastes on SRB and biorecovery of AMD metals. Mr Tabak retired from the USEPA in July of 2006.

ANNOUNCEMENT
ANNUAL WEST COAST CONFERENCE

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March 2011 will mark the 21st annual gathering of environmental professionals to the **Annual International Conference on Soil, Water, Energy, and Air** on the West Coast. For the past 20 years, this annual conference has helped to bring the environmental science community closer together by providing a forum to facilitate the exchange of information of technological advances, new scientific achievements, and the effectiveness of standing environmental regulation programs. Attracting 500 - 600 participants annually, the West Coast Conference is a highly successful and nationally known conference focusing on important and timely environmental issues related to soil, water, energy, and air. Attendees are drawn from a variety of professions including state and federal regulatory agencies, environmental engineering and consulting firms, the petroleum and chemical industries, and academia. The 2011 conference promises to be an exciting opportunity for environmental professionals who are concerned with developing creative, cost-effective assessments and solutions that can withstand the demands of regulatory requirements.

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Call For Exhibitors

We are happy to invite you to exhibit at the

27th Annual International Conference on

Soils, Sediments, Water and Energy

October 17-20, 2011

The Soils, Sediments, Water and Energy Conference has become a leading national/international conference in this important environmental area. The conference attracted nearly 600 attendees last year including a wide variety of representation from state and federal agencies; the military; various industries including railroad, petroleum, transportation and utilities; the environmental engineering and consulting community; and academia.
The exhibit area is located in the center of the conference activity to assure maximum contact and exposure with interested conference participants and potential customers. Exhibition space is limited to 48 booths to insure a high ratio of attendees to exhibitors. The rental fee for an 8' by 10' exhibit booth space is $1195.00. Outdoor areas are available for equipment demonstrations at an additional cost.

PRESENTATION TOPICS

- bioremediation
- chemical analysis
- cleanup standard setting
- environmental fate and modeling
- hazard exposure and risk assessment
- heavy metals
- hydrocarbon identification
- alternative and innovative technologies
- petroleum contamination
- regulatory programs and policies
- sediments
- site assessment/field sampling
- soil chemistry
- standard remedial technologies/ corrective actions

WHY SHOULD YOU EXHIBIT

Attendees buy products and services such as:

- analytical instruments and services
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- remediation equipment and services
- training and education products and services

THE PRICE OF YOUR BOOTH SPACE INCLUDES

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Paul Kostecki, Ph.D.
Edward J. Calabrese, Ph.D.
Clifford Bruell, Ph.D.

Professional Education Series - Online Classes

Please join Dr. Paul Kostecki and Dr. David Ludwig, Director for Education and Training, AEHS Foundation on Wednesday, October 20, 2010 at 7:00pm in room 168 (Campus Center) for a special information session to discuss the Foundation's latest venture: Professional Education and Online Learning. We will be addressing questions related to online teaching and learning and encourage anyone interested in participating in, or potentially teaching for AEHS Online to attend.

Online Classes Include:
Basic Toxicology
Systems Ecology
Population Biology
Chemical Fate and Transport
Conceptual Models
Regulation and Policy

The AEHS Foundation Professional Education Series is pleased to offer the following two, 12-week, online courses coming February 2011. CEU credits available upon request, space limited, special discounts for AEHS Foundation members and students. Both courses are:

Ideal for
• scientists • engineers • decision makers • health specialists • environmental managers • public health officials

Concerned with
• habitat • biodiversity • climate change • urbanization • transportation • introduced species • pathogens • water and wastewater • air quality • hazardous materials • chemical exposure risks

2 CLASSES COMING FEBRUARY 2011

Ecological Risk Assessment for a Sustainable Environment

Taught by **Dr. David Ludwig**
ARCADIS Global Environmental Consultancy and Director of Education and Training, AEHS Foundation

This course offers a broad introduction to the state-of-the-science and the practice of ecological risk assessment in multi-stressor contexts. Students are exposed to an array of the interrelated disciplines that are the foundation of ecological risk assessment. These include among others: stressor identification, systems ecology, population biology, chemical fate and transport, basic toxicology, restoration science, resource allocation, regulatory policy and guidelines, comparative risk analysis, and net outcomes evaluation. Case studies are presented to frame discussion and debate. In true whole-system fashion the class takes a global perspective, and we cover issues and examples from around the world and from varied ecosystems, from open oceans and alpine highlands to deserts, estuaries, wetlands, and densely settled urban environments.

Managing Risks: What To Measure And How To Assess The "Best Choice"

Taught by **Dr. Paolo Ricci**
Adjunct Professor, UMass Amherst, School of Public Health

This course introduces practical and theoretical quantitative applications of risk analysis and management – viewed as a decision-making support process. The primary focus of this course is to acquaint students with a set of decision-making principles and decision analysis tools, and demonstrate how these principles and tools apply to environmental management. In addition to the disciplines covered in both courses, this class will go into toxicological models, cancer and models including epidemiology. Course objectives include:

- Develop decision-making frameworks for assessing the "best" outcome and thus guide a final decision.
- Understand the role that informed judgment plays in justifying choices.
- Describe the logic of a risk-driven problem.
- Know how to resolve uncertainty, risk and ambiguity.
- Be knowledgeable of paradoxes and other issues that affect the implementation of any rational choice.
- Be able to develop a causal model describing the chain of events from emissions to final adverse health effect, model these and propagate the uncertainty throughout via Monte Carlo Simulations.
- Develop a simple risk-cost-benefit analysis of an environmental problem of a student's choice and understand the limitations of that analysis.
- Understand the differences between toxicological and cancer models, be able to interpret the results from those models and understand the limitations of the analysis at very low dose rates.
- Be able to develop a simple fault tree and a simple event tree applied to an accident, formulate the proper probabilistic aspects of those trees and apply the results to a case study.

Exhibitors

Booth	Affilliation
B1	Regenesis
B2	LSP Association
B3	Adventus Americas
B4	Zebra Environmental
B5	US EPA -TIFSD
B6	Stone Environmental
B7	Accutest Laboratories
B8	Isotope Tracer Technologies
B9	Pine Environmental Services
B12	RNAS
B13	Trident Environmental
B14	Vapor Trail Analytics
B15	Boart Longyear Company
B17	WSP Environment & Energy
B18	Golder Associates
B19	Alpha Anaylytical
B20	Vista GeoScience
B21	Microseeps
B22	AECOM
B25	AECOM
B23	EcoVac Services
B24	ARS Technologies
B26	Remediation Partners
B27	Kerfoot Technologies
B28	Student Career Booth
B30	Ground/Water Treatment & Technologies
B31	TRS Group
B32	PerkinElmer
B33	JRW Bioremediation
B34	Geotech Environmental Equipment
B35	GORE
B36	Bruker Daltonics
B37	TerraTherm
B38	Ion Science Americas
B39	Thermo Scientific Niton Analyzers
B40	Geo-Cleanse International
B41	XDD
B43	Eastern Analytical
B44	Pace Analytical Services
T1	Enchem Engineering
T2	In-Situ
T3	Innov-X Systems
T4	EFI Global
T5	Optienz Sensors

The Annual International Conference on Soils, Sediments, Water and Energy is pleased to call for

Nominations for the Lifetime Achievement Award

This award is given to individuals in the areas of industry, academia, government and military, who have made significant contributions to the understanding and solution of soil, sediment and groundwater pollution problems. The Life Achievement Award Committee is looking for nominations for the 2011 award.

Please send your nominations for next year's awards to

Barbara Callahan, bcalla39@comcast.net

Include an email, phone number, and mailing address for the nominee.

SCIENTIFIC ADVISORY BOARDS

AEHS attributes the success of this conference, in large part, to a very dedicated and hard working Scientific Advisory Board (SAB). The SAB evaluates abstract submissions, recommends invited papers and presenters, advises with regard to session topics, and serves as conference ambassadors. The SAB is crucial to the conference development. Care is taken to create a board that represents philosophical, scientific, regulatory, and geographical balance.

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2010 Conference at a Glance

Platform sessions and workshops may run concurrently, please check the schedule carefully.

Monday, October 18, 2010

Workshops

1. **Assessment and Evaluation of Vapor Intrusion at Petroleum Release Sites** *(8:00am – 12:00pm)* Rm 163, Lower Level
2. **Enhanced NAPL Recovery Using Surfactants** *(1:00pm – 5:00pm)* Reading Room, Concourse Level
3. **Geochemical Evaluations of Metals in Environmental Media: How to Distinguish Naturally Elevated Concentrations from Site-Related Contamination** *(1:00pm – 5:00pm)* Rm 917, 9th Floor
4. **Hands-On Sustainability Assessment Tools** *(1:00pm – 5:00pm)* Rm 168, Lower Level
5. **Environmental Fate of Hydrocarbons in Soils and Groundwater** *(2:00pm – 5:00pm)* Rm 101, Lower Level
9. **Utilization of Stable Isotopes in Environmental and Forensic Geochemistry Studies** *(2:00pm-4:00pm)* Rm 163, Lower Level

Tuesday, October 19, 2010

Platform Sessions

Morning, *8:30am-Noon,* *Sessions are concurrent*
Session 1: **Marcellus Shale Development: Associated Issues and Impacts,** Rm 163, Lower Level
Session 2: **Sediments,** Rm 101 Lower Level
Session 3: **Phytoremediation** (starts at 9:00), Reading Room, Concourse Level

Afternoon, *1:30pm-5:30pm,* *Sessions are concurrent*
Session 1: **Sustainable Remediation,** Rm 163, Lower Level
Session 2: **Clean Energy**, Rm 101, Lower Level
Session 3: **Nanotechnology,** Reading Room, Concourse Level
Session 4: **International Soil & Groundwater Remediation Case Histories,** Rm 168, Lower Level

Poster Session *4:00pm - 6:00pm,* Rm 162 and 165, Lower Level

Social *4:30pm-6:00pm,* Exhibit Areas

Workshops

6. **Nanotechnology: Applications in Environmental Remediation** *(7:00pm – 9:00pm)*, Rm 163, Lower Level
7. **LSP Board Disciplinary Case Workshop** *(6:30pm – 9:30pm)*, Rm 101, Lower Level
8. **In-Situ Thermal Remediation** *(6:30pm – 9:30pm)*, Rm 168, Lower Level

LUNCHEON
12:00pm – 1:30pm
Amherst Room, 10th Floor, Campus Center

SPEAKER: **Annetta Watson**
Oak Ridge National Laboratory, Oak Ridge, TN

"Developing Health-Based Pre-Planning Clearance Guidelines for Site Remediation Following a Chemical Terrorist Attack"

Wednesday, October 20, 2010

Platform Sessions

Morning, *8:30am-Noon,* *Sessions are concurrent*
Session 1: **Vapor Intrusion I,** Rm 163, Lower Level
Session 2: **NAPL** *(starts at 9:00),* Rm 101, Lower Level
Session 3: **Degradation of Polychlorinated Biphenyls** *(starts at 9:00)*, Reading Room, Concourse Level

Afternoon, *1:30pm-5:00pm,* *Sessions are concurrent*
Session 1a: **Vapor Intrusion II**, Rm 163, Lower Level
Session 1b: **Regulatory Panel Discussion: Grappling with Vapor Intrusion,** Rm 163, Lower Level
Session 2: **PCBs**, Rm 101, Lower Level
Session 3: **Environmental Forensics**, Reading Room, Concourse Level
Session 4: **Site Remediation – Diagnostics, In-Situ Treatment, and Vapor Intrusion**, Rm 168, Lower Level

Poster Session *4:00pm-6:00pm,* Rm 162 and 165, Lower Level

Wine Reception *5:00pm-7:00pm,* Exhibit Hall, First Floor

AEHS Online Information Session *7:00pm-8:00pm,* Rm. 168, Lower Level

Workshops

10. **In-Situ Chemical Oxidation** *(6:30pm-9:30pm)* Rm 163, Lower Level
11. **Incorporating Green into the Cleanup Dialogue: The Green Remediation, Sustainable Remediation, and Green Chemistry Workshop** *(7:00pm-9:00pm)* Rm 101, Lower Level

LUNCHEON
12:00pm – 1:30pm
Amherst Room, 10th Floor, Campus Center

SPEAKER: **Derek Lovley**
University of Massachusetts, Amherst, MA

"Wiring Microbes to the Sun: Sustainable Energy and Bioremediation with Microbe-Electrode Interactions"

Thursday, October 21, 2010

Platform Sessions

Morning, *8:00am-Noon,* *Sessions are concurrent*
Session 1: **Bioremediation** *(starts at 9:00)* Rm 163, Lower Level
Session 2: **Heavy Metals,** Rm 101, Lower Level
Session 3: **Fate & Transport** (starts at 8:00) Reading Room, Concourse Level

Afternoon, *1:30pm-5:30pm,* *Sessions are concurrent*
Session 1: **Innovative and Alternative Remedial Technologies,** Rm 163, Lower Level
Session 2: **Site Assessment/Field Sampling,** Rm 101, Lower Level
Session 3: **Advanced Tools,** Rm 168, Lower Level

LUNCHEON
12:00pm – 1:30pm
Amherst Room, 10th Floor, Campus Center

SPEAKER:
Tim Kruppenbacher
General Electric, Albany, NY

"Update on the Hudson River Dredging Program"

Protein Design, Synthetic Biology and Hybrid Metamaterials

Ronald L. Koder, Andrew C. Mutter, David T. Crouse, Department of Physics, 315 Marshak Science Bldg., The City College of New York, 160 Convent Avenue, New York, NY 10031 212-650-5583, rlkoder@gmail.com

Sean Elliott, Boston University

The systemic analysis of photosynthesis led in the late 1980s to the bioinspired concept of 'integrated modular assembly' as a simple basis for constructing molecular devices, fashioned of any nanoscale material capable of holding the active elements at fixed distances, which can transform photonic energy into vectorial electron transfer. We describe our initial results in the de novo design of phthalocyanine-based charge separation protein domains which can be modularly attached via molecular Lego to other designed or natural protein domains and act as centers for light activated electron extraction and/or injection. We are coupling these materials to novel metamaterial electrodes which hold great promise as solid-state light harvesting and distribution materials in multi-junction biofuel-generating solar energy nanodevices.

Presenting Author: Ronald Koder

One Billion Tons of Biomass Would Be Sufficient to Completely Replace Crude Oil If We Increased Their Energy Conversion Efficiency

Y-H Percival Zhang, Associate Professor, Biological Systems Engineering Department, Virginia Tech, Blacksburg, VA 24061, Tel: 540-231-7414, Email: biofuels@vt.edu

Crude oil is the most important primary fossil fuel because of (i) its high energy density, (2) easy transportation, and (iii) convenient storage. After refining, the products of crude oil are transportation liquid fuels (e.g., gasoline, diesel, jet fuel), heat fuel, plastics, and so on. But the depleting resource, soaring prices, energy security and concerns of climate change are driving us to seek for sustainable carbon-neutral resources to replace crude oil.

Non-food biomass is the low-cost and most abundant biological resource. We suggest fractionation of lignocellulose and the co-utilization of lignocellulose components – cellulose, hemicellulose and lignin for different applications like oil refining. For light-duty passenger vehicles, we propose to develop sugar-fuel cell vehicle (SFCV), where carbohydrate is a high-energy hydrogen carrier (14.8 mass H2%) and on-board bioreforming generates high-purity hydrogen for PEM fuel cells [1]. Bio-reforming is mediated by cell-free synthetic enzymatic pathway biotransformation (SyPaB) without relying on living organisms [2, 3]. This hypothetic powertrain system would have nearly four-time efficiency higher than that of cellulosic ethanol-internal combustion engine and have the comparative energy efficiency with battery electric vehicle but have much higher energy storage density. For heavy-duty vehicles or jet planes, we propose to convert hemicellulose in biomass hydrolysate to xylitol by SyPaB and then to liquid hydrocarbons by aqueous phase reforming. The combination of biocatalysis and catalysis can retain nearly ~94% of chemical energy in hemicellulose to sulfur-free liquid hydrocarbons. Also, we suggest conversion of lignin to other chemicals [4]. We estimated that approximately one billion tons of biomass would be sufficient to completely replace crude oil because of very high conversion efficiencies and good economy for co-utilization.

The above scenario is based on two key technologies developed in our laboratory – (1) cellulose solvent- and organic solvent-based lignocellulose fractionation COSLIF [5] and (2) high-yield and efficiency SyPaB [6].

[1] Y.-H.P. Zhang, Energy Environ. Sci. 2 (2009) 272-282.
[2] Y.-H.P. Zhang, Biotechnol. Bioeng. 105 (2010) 663-677.
[3] Y.-H.P. Zhang, J.-B. Sun, J.-J. Zhong, Curr. Opin. Biotechnol. 21. DOI:10.1016/j.copbio.2010.05.005 (2010).
[4] Y.-H.P. Zhang, J. Ind. Microbiol. Biotechnol. 35 (2008) 367-375.
[5] Y.-H.P. Zhang, S.-Y. Ding, J.R. Mielenz, R. Elander, M. Laser, M. Himmel, J.D. McMillan, L.R. Lynd, Biotechnol. Bioeng. 97 (2007) 214-223.
[6] Y.-H.P. Zhang, B.R. Evans, J.R. Mielenz, R.C. Hopkins, M.W.W. Adams, PLoS One 2 (2007) e456.

Presenting Author: Y-H Percival Zhang

Pyrolysis Based Technologies for the Conversion of Lignocellulosic Biomass into Fuels and Chemicals

George W. Huber, University of Massachusetts-Amherst, MA 01003, huber@ecs.umass.edu

In this presentation we will discuss various pyrolysis based approaches for the conversion of lignocellulosic biomass into fuels and chemicals. Pyrolysis is the thermal decomposition of biomass into a mixture of semi-volatile molecules. These pyrolysis vapors can then be condensed into a bio-oil or pyrolysis oil that contains more than 300 compounds. This pyrolysis oil is the cheapest liquid fuel made from biomass. However, this oil is unstable, acidic, insoluble with petroleum based fuels, has a high oxygen content, and polymerizes with time. The resulting bio-oil can be converted into various fuels and chemicals by aqueous-phase hydrodeoxygenation.

Alternatively zeolite catalysts can be added into the pyrolysis reactor to directly produce gasoline range aromatics from biomass by an approach we call catalytic fast pyrolysis (CFP). The pyrolysis vapors enter directly into the zeolite pores where they undergo a series of dehydration, decarbonylation and oligomeriation reactions. The shape, pore structure, and active sites of the zeolite catalysts are critical in obtaining high yields of the desired aromatic products. CFP has several advantages compared to other biomass conversion technologies in that a liquid fuel is being produced directly from solid biomass in a single catalytic reactor, short residence times, and inexpensive catalysts are used.

We believe that pyrolysis based technologies have a tremendous potential for the conversion of lignocellulosic biomass into renewable fuels and chemicals. As will be demonstrated in this presentation chemistry, chemical catalysis and chemical engineering are critical 21st century needs to help make renewable energy a practical reality.

Presenting Author: George W. Huber

Routes for Using Polymer in Photovoltaic Applications

Thomas P. Russell, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA 01003, USA Email: Russell@mail.pse.umass.edu

Work done in collaboration with R. Hayward, T. Emrick, B. Hammer, L. Li and D. Chen

Polymers offer several routes to produce all-organic to hybrid polymer-based photovoltaic devices. These include the use of block copolymers where the microphase separation of hole-conducting and electron conducting blocks occur on dimensions comparable to chain dimensions an, hence, are comparable to the exciton diffusion length. In addition, mixtures of a photoactive polymer with an electron conducting additive, like PCBM or semi-conductor nanorods, constitute a classic mixture where the phase separation and ordering of the photoactive polymer and additive are controlled to yield bicontinuous pathways for electron and hole transport. Finally, a new route to generate bicontinuous morphologies where an electron conducting additive, like PCBM or semi-conducting nanoparticles or nanorods, is added to a mixture of photoactive polymers and the interfacial activity of the nanoscopic additive results in an assembly of the nanoparticles at the interface which, upon subsequent phase separation, the reduction in the interfacial area causes jamming of the particles at the interface that arrests the phase separation into a bicontinuous or "bijel" state that presents a unique morphology for PV applications. Advances in our laboratories in each of these areas will be presented.

Presenting Author: Thomas P. Russell

Charge Transport as the Basis for Clean Energy Devices

Thai Thayumanavan, University of Massachusetts710 N. Pleasant Street, Amherst MA, 01003, 413-545-1313,thai@chem.umass.edu

No Charge transport is the crucial process in most energy devices, especially in emerging renewable energy technologies such as solar cells and fuel cells. Enhancing the efficiency of charge transport in these materials will have a significant impact on enhancing the viability of these devices. The charge transport materials design is greatly impacted by its molecular components and their organization. Yet, very little connection is made between the molecular scale charge transfer and materials scale charge transport properties. Continuum length scale analysis from molecules to materials, using Chemistry as the central science, is a mandatory pathway for innovative impacts in renewable energy science. Our research is focused on taking this comprehensive approach to the science that impacts solar cells and fuel cells. The principles behind our approach will be discussed.

Presenting Author: Thai Thayumanavan

A Path for High Volume Production of Ordered Hybrid Materials for Energy Applications

James Jim Watkins, Polymer Science and Engineering Department and Center for Hierarchical Manufacturing, University of Massachusetts, Amherst, MA USA 01003, (413) 545-2569, watkins@polysci.umass.edu

Polymer and polymer-inorganic hybrid materials organized at the nanoscale are at the heart of many emerging energy conversion and storage materials and devices. The challenge is to produce these well ordered materials using process platforms and materials sets that can be scaled for cost-effective, high value-added manufacturing.

Microphase segregated block copolymer melts are attractive candidates for templating nanostructured hybrids, composites, and device structures due their ability to spontaneously form periodic spherical, cylindrical, bicontinuous and lamellar morphologies at controllable length scales. Their use in large scale applications, however, has been limited by the cost and scalability of the synthetic techniques necessary for their preparation and challenges associated maintaining g order at high additive loadings. Here we discuss low cost systems for self assembled materials that can be deployed on a roll-to-roll platform with the objective of extending polymer self assembly to low cost per function devices for energy generation and storage. Specifically we report that nanostructured templates with sub-10 nm domains can be easily obtained through the blending of commercially available disordered polymer surfactants with commodity homopolymers that selectively associate with one segment of the surfactant. We further demonstrate that order in the surfactant systems can be induced by nanoparticle additives that can undergo multi-point hydrogen bonding with the surfactants. These additives, which include metal and semiconducting nanoparticles, fullerenes, and other active components, impart functionality to the device. The behavior of the template and composite systems, their fabrication using conventional printing and coating technologies, and their use in well ordered hybrid materials for flexible photovoltaic and battery applications will be discussed.

Presenting Author: Jim Watkins

FINAL REPORT

AIR FORCE GRANT #FA9550-11-1005

Support for the 26th International Conference on Soils, Sediment, Water & Energy

University of Massachusetts Amherst, Amherst, MA

October 18 - 21, 2010

January 2016

150 Fearing St., Suite 21, Amherst, MA 01002 Tel: 413-549-5170 Fax: 413-549-0579 www.aehsfoundation.org

BACKGROUND: The conference has attracted professionals and regulatory scientists from 35+ countries annually for the last 25 years. It is recognized as one of the premier educational and research events for its strong technical content, renowned technical information exchange activities and breadth of representation from academe, industry and government sectors. The conference proceedings are published and distributed as a searchable CD and on the Foundation's website at no charge. In addition, some manuscripts are accepted in the peer-reviewed Journal of Soil and Sediment Contamination.

The conference has been an excellent vehicle to get national issues and scientific information before the user community including regulators, practitioners and researchers. A variety of organizations have used the conference as a forum to further knowledge, discussion and debate in their areas of interest. These include state agencies and their affiliates (Massachusetts Department of Environmental Protection (MADEP), NY Department of Conservation (NYDEC), Louisiana Department of Environmental Quality (LADEQ), Interstate Technology Research Committee), federal agencies (Department of Energy, Department of Defense, USEPA, ATSDR, etc.), military (Air Force, Army and Navy), trade organizations (API Energy, Association of American Railroads, Oxygenated Fuels Association, etc.) as well as a number of industrial supporters (Shell Oil, General Electric, Electric Power Research Institute (EPRI), Gas Research Institute (GRI), etc.).

The objectives of the conference have been to convene interdisciplinary researchers, practitioners and regulatory scientists who focus on environmental impacts of human activities especially in relationship to sustainability. The conference began in 1985 in response to the environmental impacts of the country's reliance on hydrocarbon based energy production. The conference has expanded its mission to include energy, recognizing the positive impact clean and renewable energy will have on the environment.

SUMMARY: The 2010 conference covered a variety of topics in the environmental arena including the Clean Energy Session sponsored by the Air Force Research Laboratory. Other sessions included: *Marcellus Shale Development: Associated Issues and Impacts; Sediments; Phytoremediation; Sustainable Remediation/Sustainability; Nanotechnology; Site Remediation – Diagnostics, In-Situ Treatment, and Vapor intrusion; Vapor Intrusion; NAPL; Degradation of Polychlorinated Biphenyls; PCBs; Environmental Forensics; Bioremediation; Heavy Metals; Fate & Transport; Innovative Remedial Technologies; Site Assessment/Field Sampling*; and *Advanced Tools for Assessment.*

Overall, there were 140 platform presentations, 60 posters and 11 workshops. Forty-eight exhibitors displayed equipment and services relevant to environmental assessment, monitoring and cleanup. A complete, detailed listing of conference components is included in the final program, (Appendix I).

The Clean Energy Session was comprised of seven platform presentations covering a variety of energy related topics from green gasoline to polymer use in photovoltaic applications. The session was highlighted by several presentations representing Air

Force Research Lab sponsored projects including: *Personalized Energy and Water for the Non-Legacy World*, Dr. Daniel Norcera, MIT, Cambridge, MA; *Protein Design, Synthetic Biology and Hybrid Metamaterials*, Dr. Ronald Koder, The City College of NY, New York, NY; and *One Billion Tons of Biomass Would Be Sufficient to Completely Replace Crude Oil If We Increased Their Energy Conversion Efficiency*, Dr. Percival Zhang, Virginia Tech University, Blacksburg, VA. Their abstracts are included in Appendix II.

The 600+ attendees included representatives from state and federal agencies, military, industry (including railroad, petroleum, transportation, and utilities), environmental engineering and consulting, and academia (Fig. 1).

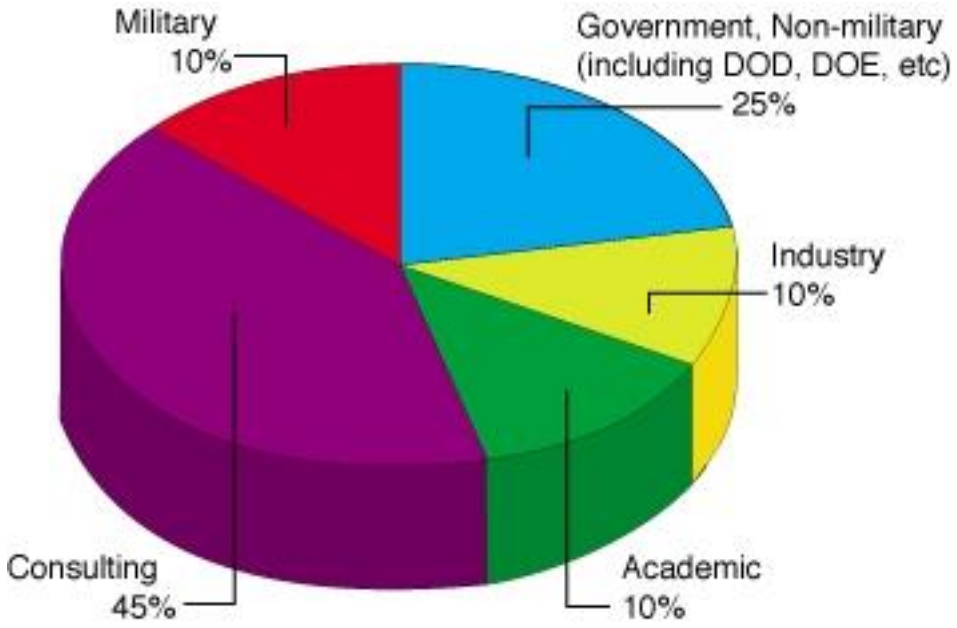

Fig. 1. Attendance representation by Category

The conference proceedings were produced in 2011 and made available through the Foundation's website, **www.aehsfoundation.org/ecc-proceedings.aspx,** as a downloadable PDF file at no charge.

IMPORTANCE TO THE AIR FORCE: The meeting addressed issues of critical importance to the Air Force especially as it relates to the military's need for innovative approaches to meeting its energy needs in a sustainable manner as well as minimizing its carbon footprint. The conference also showcased the Air Force's stewardship and commitment to the environment, social benefit and academic partnerships.